

# **Designing a Low-cost, Light-weight Electric Snowmobile**

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The Indiana University-Purdue University Indianapolis (IUPUI) participated in the 2015 and the 2016 SAE Clean Snowmobile Challenge (CSC). Both years the team developed an electric snowmobile weighing less than 226 kg (500 lb). Last year a Phantom Snowmobile PD250LT was utilized as a base sled. It was powered by a NetGain WarP 7 DC-series motor and connected directly to the sprocket shaft using a Continental Silent Sync Belt. The belt itself is very quiet and can produce less than 59 dB. The team continued and re-engineered a Polaris Indy 550 to be an environmental friendly snowmobile without compromising the towing capability and produced less noise. For the second year in a row the snowmobile designed had the lowest cost at the competition. This year they used a AC motor that weighed half as much as the DC motor, allowing for the design to have increased battery capacity.

The 2016 CSC was the 12th competition where SAE International Clean Snowmobile Challenge has a “Zero-Emissions” category. Global climate change brings the need for alternative transportation choices that have higher efficiency, and create fewer pollutants. There are many efficient hybrid and electric cars being produced that are creating less pollution. However, recreational vehicles creates its fair share of emissions. The Greenland Ice Cap is highly sensitive to chemical and human’s byproduct; the researchers that are located in the Summit Station require special mode of transportation to and from their research sites that do not pollute. Snowmobile trails in the Eastern US are full of riders. Viable improvements to snowmobile designs are needed.

The 2016 design used students from several disciplines: Mechanical Engineering, Electrical Engineering and others. We received support from MURI and ITEC.